



## Top meeting

[www-cdf.lbl.gov/~currat/talks/](http://www-cdf.lbl.gov/~currat/talks/)

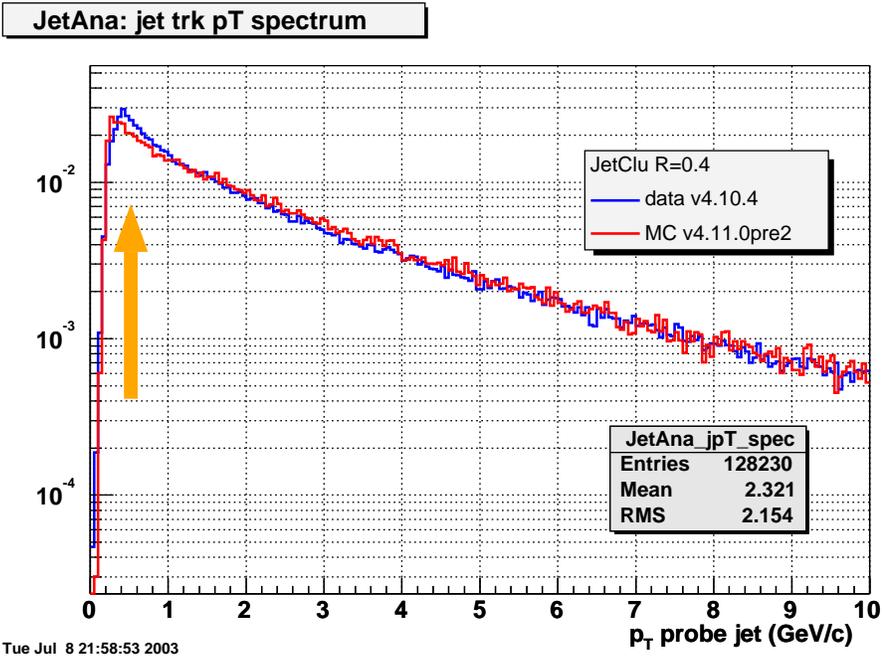
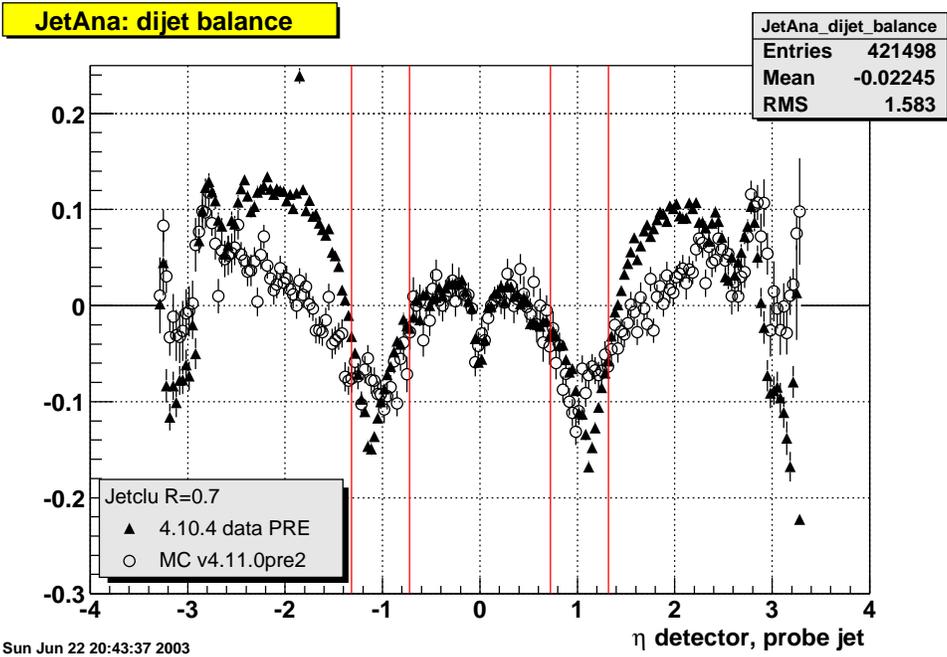
**Charles Currat**  
LBNL

**September 17, 2003**

- ◆ Progress in simulation with v. 5.1.0pre7



# Parameterization of the fraction of deposited energy for hadronic showers in Gflash



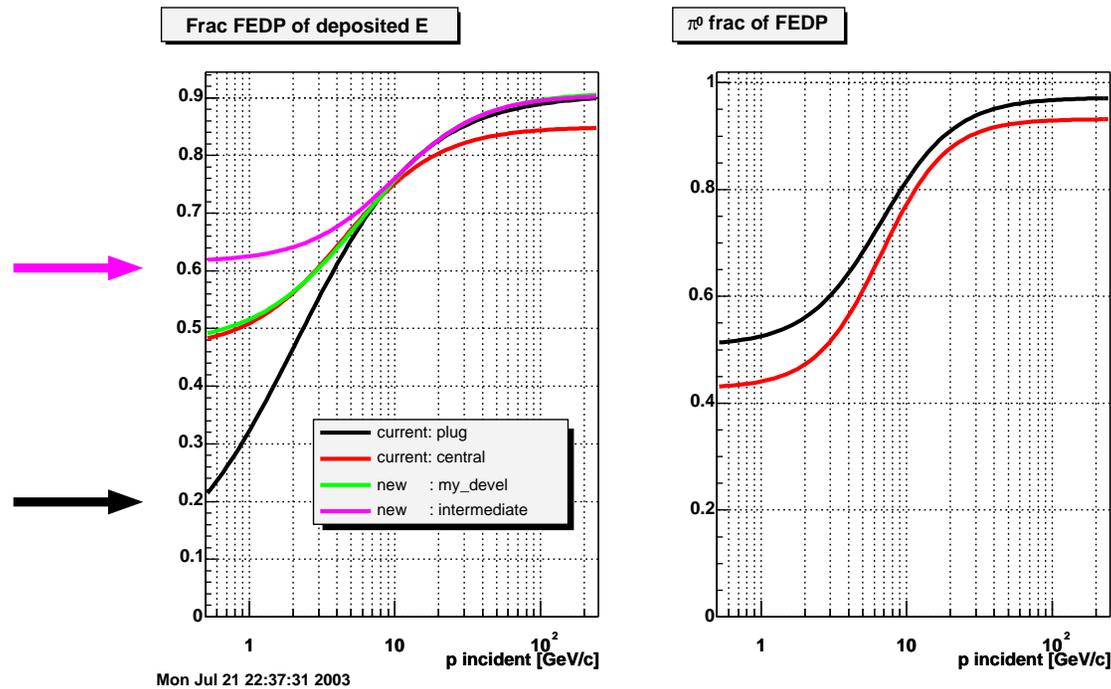
👉 Tuning with test beam data available down to 8 GeV. *Terra incognita* below that. Note: average  $p_T$  of tracks in Jet20 is  $\langle p_T \rangle \simeq 2.5$  GeV/c, peaks at  $p_T \lesssim 0.5$  GeV/c



## Changes in simulation v. 5.1.0pre7



- ◆ `gfinha.F` — activation of the 'magenta' FEDP curve in the plug



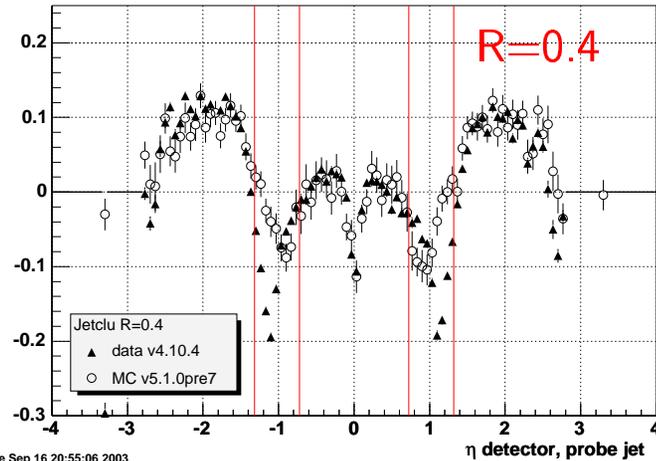
- ◆ `CalParameters.hh` — update on  $z$ -coordinate of faceplates, very minor impact
- ◆ `CalorKey.cc` — tower index boundaries bug fix, NO effect on the simulation, *maybe* on the data
- ◆ `GflashSim.cc` — various changes to uniformize the treatment of towers with split segmentation 24/48 in WHA/plug
- ◆ `CalDataMaker.cc` — same thing, plus PPR. Thanks to Willis.



# Dijet balance

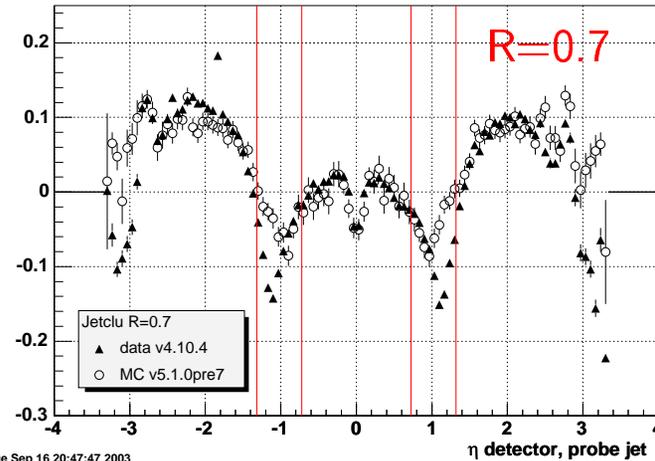


JetAna: dijet balance



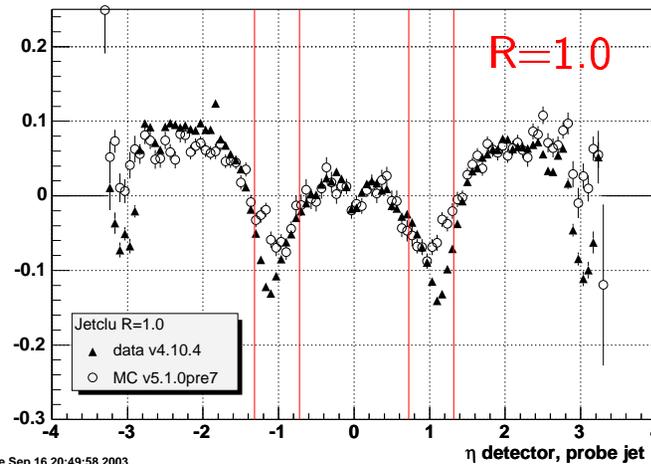
Tue Sep 16 20:55:06 2003

JetAna: dijet balance



Tue Sep 16 20:47:47 2003

JetAna: dijet balance



Tue Sep 16 20:49:58 2003

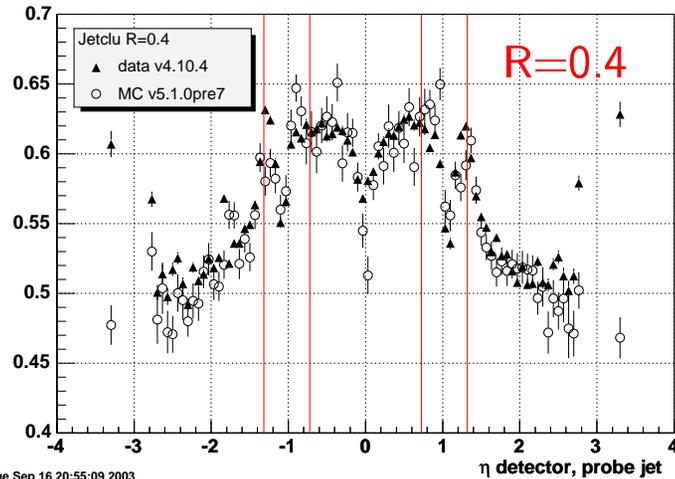
- ◆ Plug looks good now with magenta curve down to  $|\eta| \simeq 3$  !!
- ◆ Status quo in the WHA... (not much was expected)



# Jet EM fraction

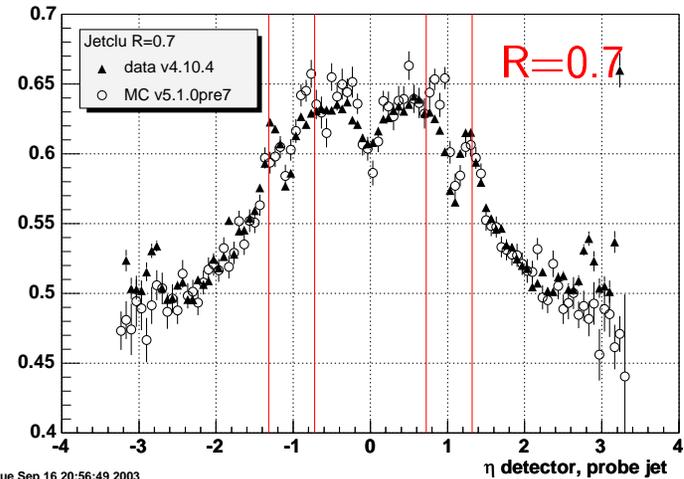


JetAna: jet EM fraction



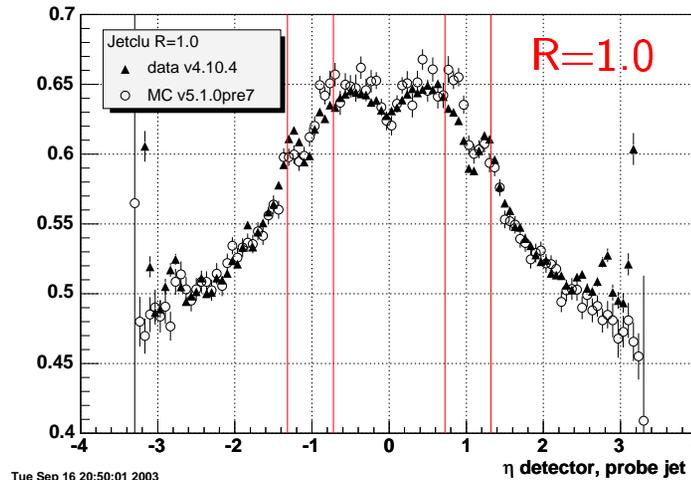
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JetAna: jet EM fraction



Tue Sep 16 20:56:49 2003

JetAna: jet EM fraction



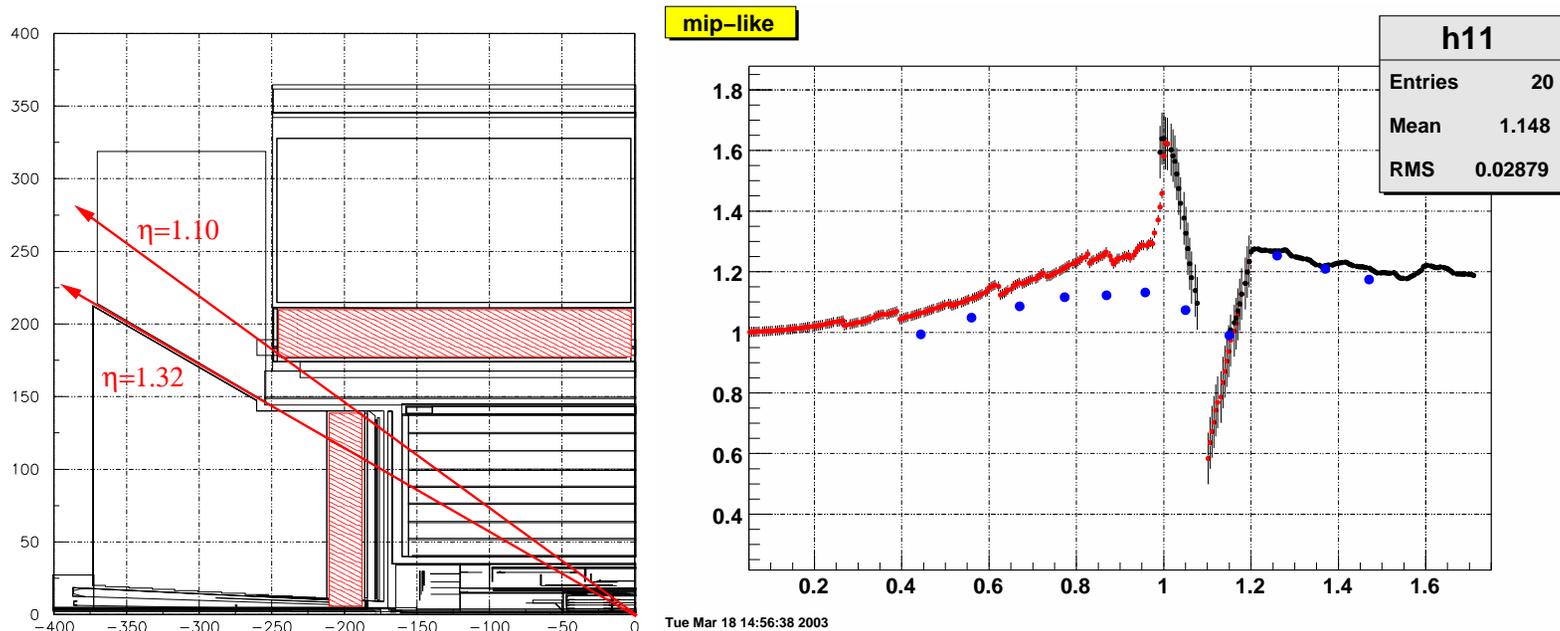
Tue Sep 16 20:50:01 2003

- ◆ Towers in the wall below  $|\eta| < 1.0$ ... fluctuations only?
- ◆ WHA looks mostly OK. Global scale problem then?



# The endwall hadron calorimeter

- ◆ The only one part left to be taken care of in the simulation
- ◆ Presumably all about finding an appropriate treatment for 2-3 specific towers



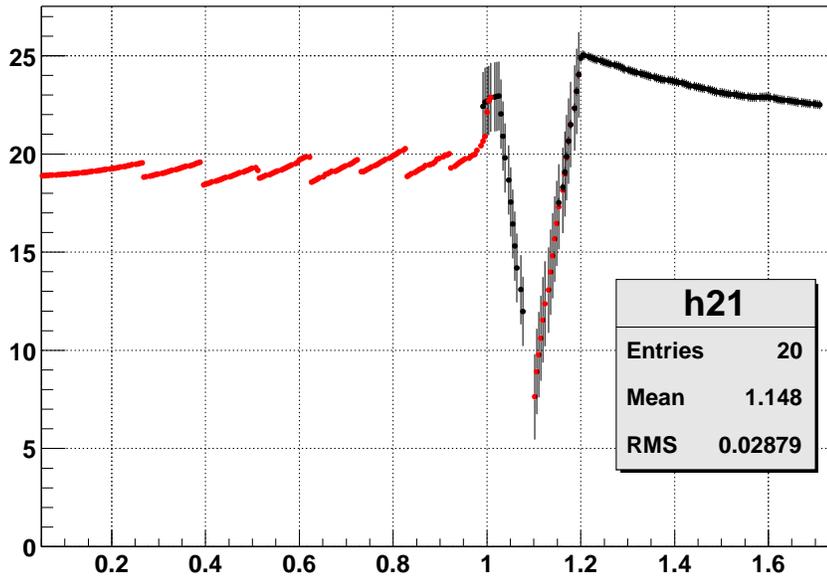
- ◆ Notice that balance dip is at  $|\eta| = 1.10$ ... not  $|\eta| = 1.32$  where the physical gap between wall/plug actually is  $\Rightarrow$  no EM compartment in the way!
- ◆ Notice transition in "sandwich" type: coil/CEM/CHA  $\rightarrow$  coil/CEM/WHA  $\rightarrow$  PEM/coil/WHA  $\rightarrow$  PEM/PHA/coil/WHA  $\rightarrow$  PEM/PHA (note: coil thickness is  $0.13\lambda_I$ )
- ◆ Unclear what Gflash does in that particular region



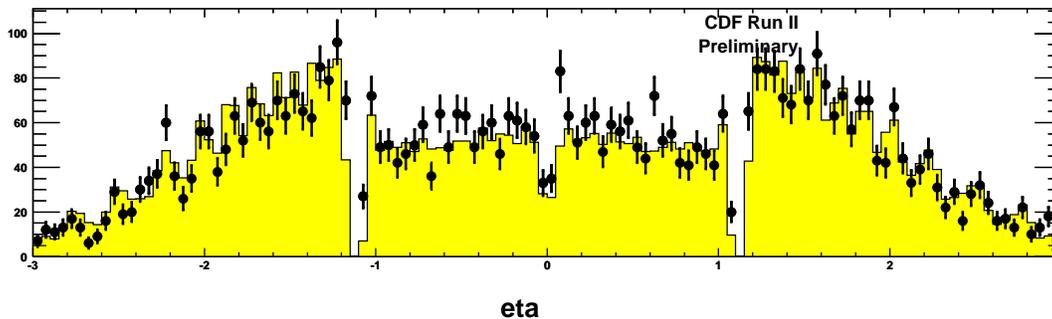
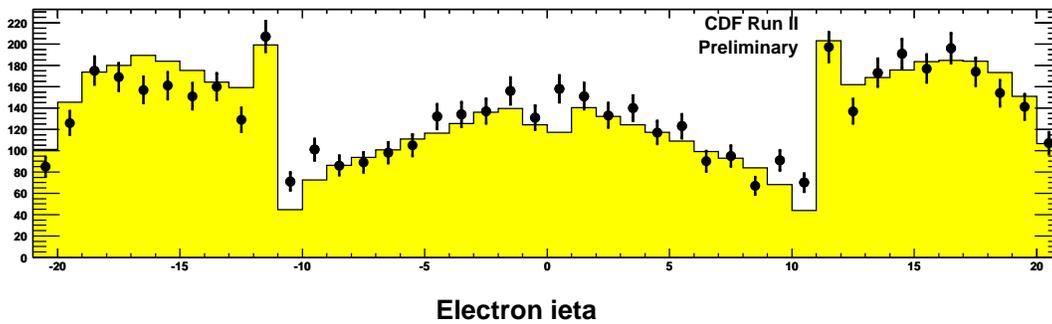
# On the electrons side

There's a dip in the  $X_0$  profile too. Beate & Greg had a look at the electrons (June).

radl2em



Eri Mar 24 15:20:25 2003

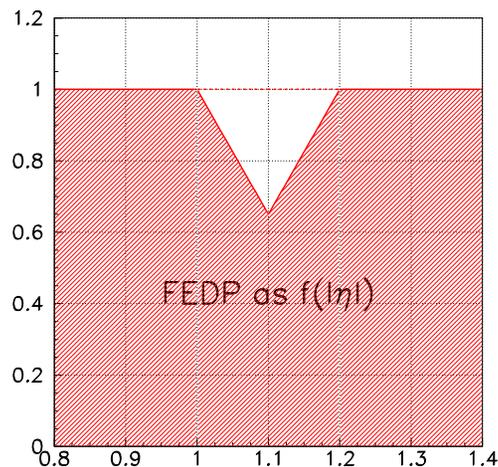


👉 Q: is the electron E response profile flat? ⇨ YKK & Co

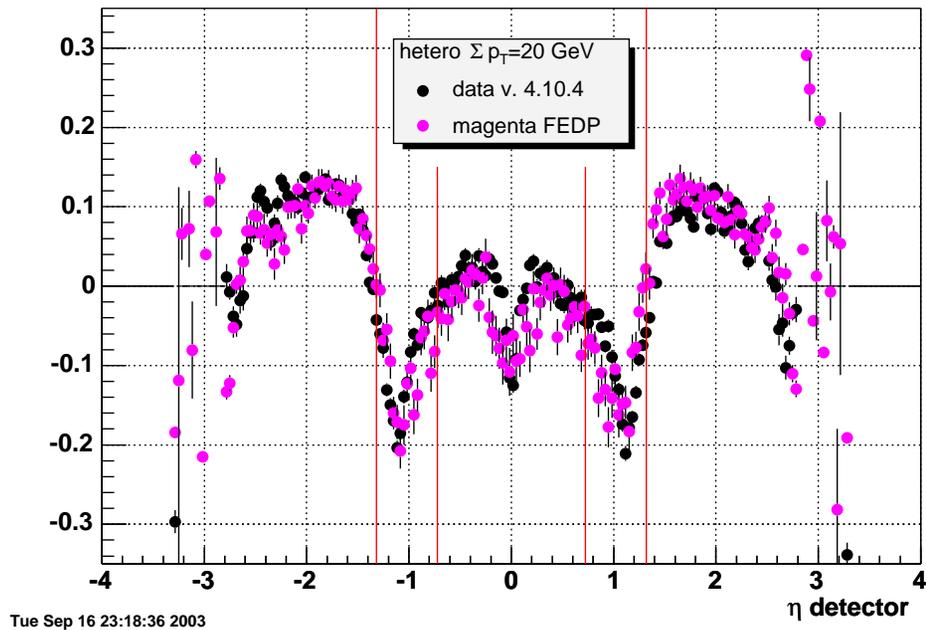


## Tweaking in the wall

- ❖ One quantity has to be "notched" down... unclear which one
- ❖ Gflash energy spots in inactive regions are supposed not to be added up → a double check wouldn't hurt here
- ❖ Electron side or hadron side (shower types handled separately in Gflash)
- ❖ Yet another game with fake jets (the fraction of deposited E depends on the amount of material after all)...



Fake jets: balance [R=0.4]



👉 Works well, remains to be justified... (NB: jet EM fraction unaffected)

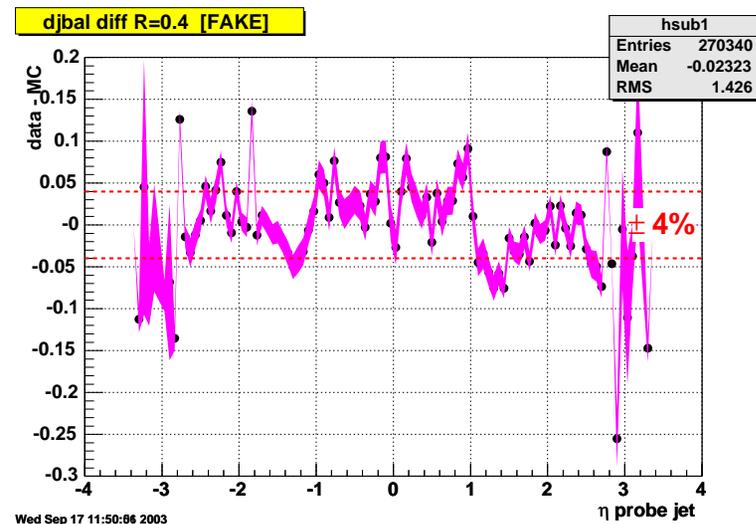
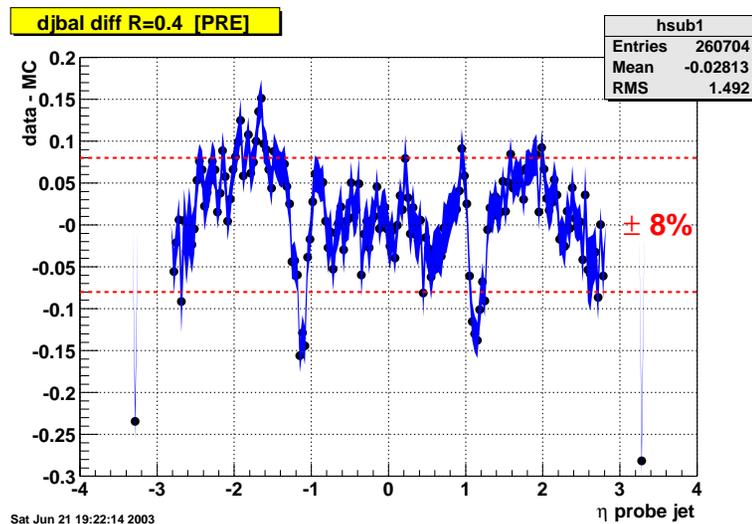


## Towards *new* systematics



Recommendation from the Jet Corrections group (yet to be approved, but the bottom line is...):

- ❖ unsure that a clean fix could be found at all (implementation mismatch) → go ahead with a tweak, several ways to do that carefully, **immediate availability**
- ❖ meantime jet corrections people working out the details/justification → at the end of the day, **most likely no big difference for jet users**
- ❖ possibility to specifically use Geant in the wall
- ❖ foretaste of dijet balance difference plots (data v. 4.10.4 - MC v. 5.1.x generation). **Based on fake jets!** (but why not)



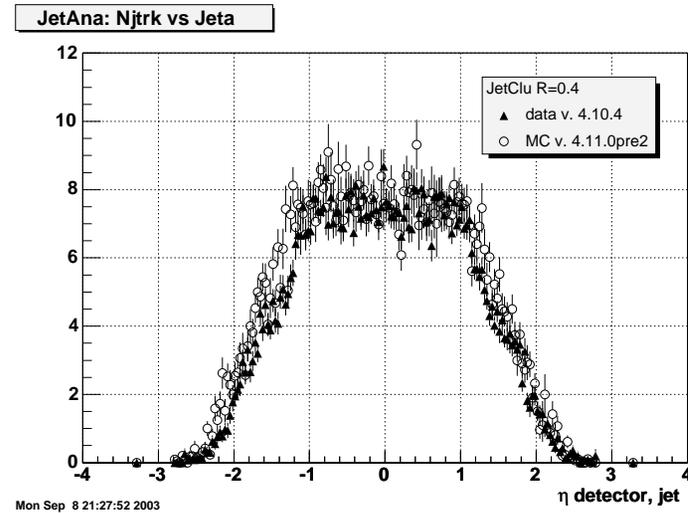
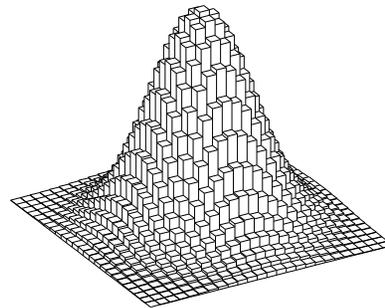
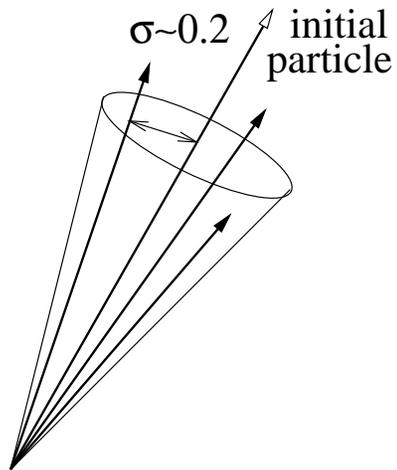
👉 Looks promising!



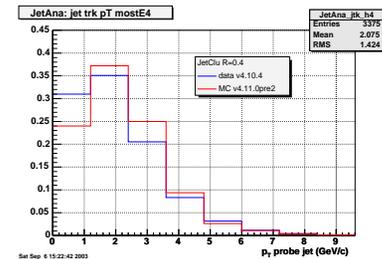
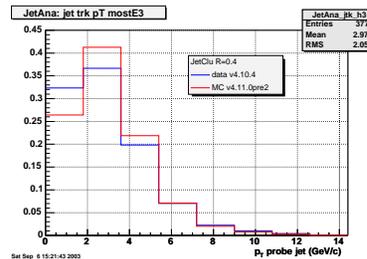
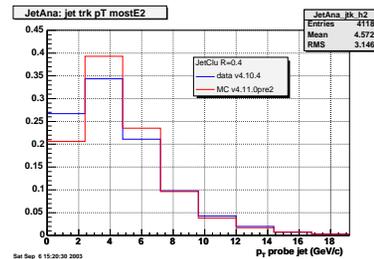
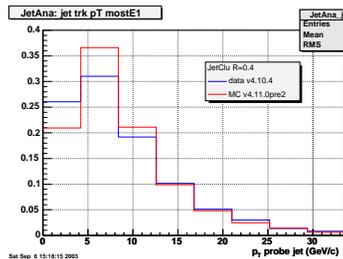
# Fake jets in a nutshell 1/2



Simple modification of the FakeEvent.cc class. On average, 8 reconstructed tracks per jet (central)



Wants to mimic Jet20 -> the pT spectrum of the leading tracks in a jet suggests the Ansatz ΣpT = 8.5 + 4.5 + 3 + 2 + 4 × 0.5 = 20 GeV/c

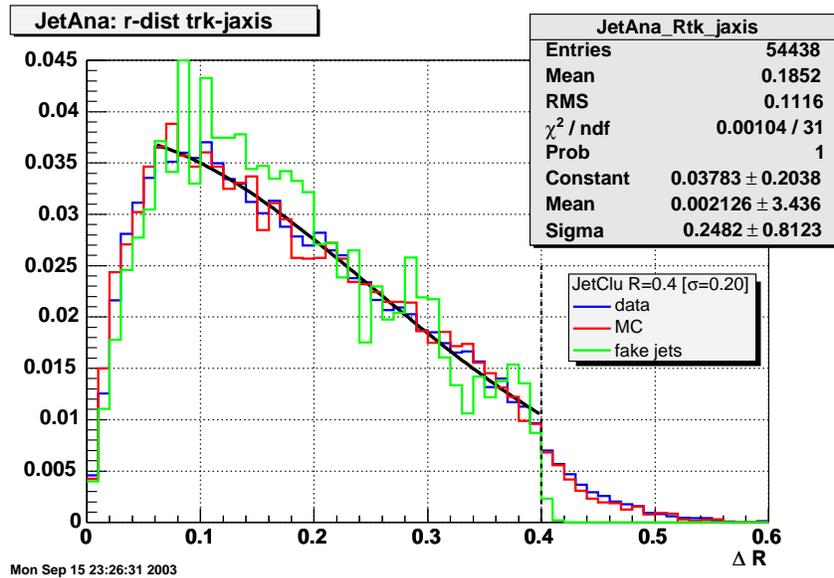




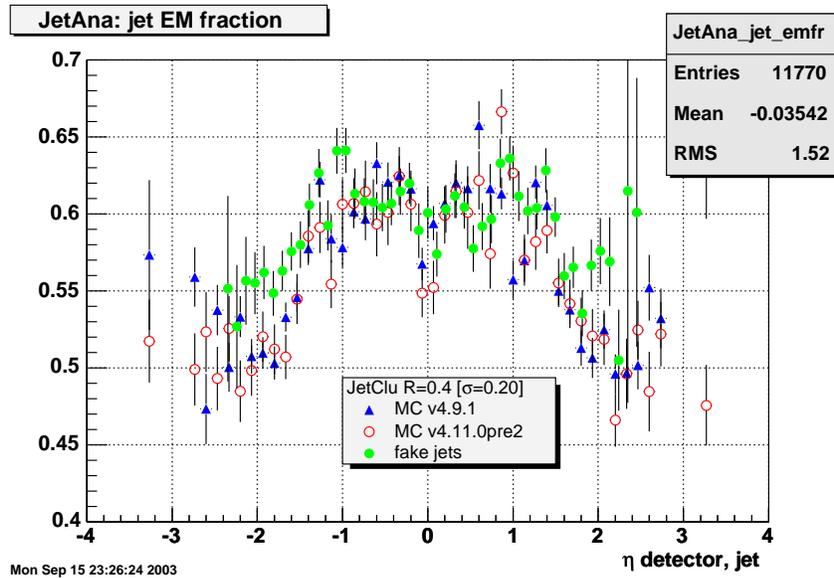
## Fake jets in a nutshell 2/2



Comparison data/MC/fake jets of  $\Delta R(\eta, \phi)$  between jet axis and reconstructed tracks (CdfTrackColl) for JetClu with  $R=0.4$



Idem for the jet EM fraction



👉 Results are not that bad. Definitely predictive enough for validation of calorimeter code tweaking



## What next?



- ❖ Thanks to Reda, Beate and all for the express smooth prod of the samples and Stntuples!!
- ❖ Single Track Task Force to validate/finalize the magenta curve in the plug
- ❖ STTF will also shed light on the WHA, single pions needed
- ❖ Problem getting pinpointed: EM measurement gap between T9/10 affecting jets
- ❖ FakeJet tool to assess tweaking (unsure yet that a clean fix could be found at all)
- ❖ New recruit to take things over, Yeongdae Shon (U. Wisconsin)!
- ❖ Timescale: a nice faithful simulation of the entire calorimetry will be a nice Christmas gift